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ABSTRACT

Nutrition is well-recognized as a necessary component of educational programs for physicians. This is to be valued in that of all factors affecting health in the United States, none is more important than nutrition. This can be argued from various perspectives, including health promotion, disease prevention, and therapeutic management. In all cases, serious consideration of nutrition related issues in the practice is seen to be one means to achieve cost-effective medical care. These modules were developed to provide more practical knowledge to health care providers, and in particular primary care physicians. This module is designed to help physicians to be knowledgeable regarding dietary treatment for hypertension and to be able to counsel patients to adhere to a low sodium diet and dietary modifications of potassium if necessary. Also covered is nutritional assessment for the hypertensive patient. Included are learning goals and objectives, self-checks of achievement with regard to goals, and references for the physician and for the physician to give to the patient. The appendices include a daily food guide, body weight guidelines, a nomogram for estimating caloric needs, conversion factors, content of selected food in food groups, sodium content of antacids, lists of high-sodium foods and low-sodium herbs, and seasonings. (CW)

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11 Dietary Management in Hypertension

Ann L. Molleson
Charlette R. Gallagher-Allred

Nutrition in Primary Care

Department of Family Medicine
The Ohio State University
Columbus, Ohio 43210

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The Nutrition in Primary Care Series Contains These Modules:

1. Nutrient Content of Foods, Nutritional Supplements, and Food Fallacies
2. Appraisal of Nutritional Status
3. Nutrient and Drug Interactions
4. Normal Diet: Age of Dependency
5. Normal Diet: Age of Parental Control
6. Normal Diet: Adolescence
7. Normal Diet: Pregnancy and Lactation
8. Normal Diet: Geriatrics
9. Dietary Management in Obesity
10. Dietary Management in Diabetes Mellitus
11. Dietary Management in Hypertension
12. Dietary Management in Hyperlipidemia
13. Dietary Management in Gastrointestinal Diseases
14. Dietary Management for Alcoholic Patients
15. Nutritional Care of Deteriorating Patients
16. An Office Strategy for Nutrition-Related Patient Education and Compliance

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11 Dietary Management in Hypertension

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11 Dietary Management in Hypertension

Nutrition in Primary Care

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Introduction

Hypertension is a most prevalent and powerful contributor to cardiovascular disease. It is estimated that 15% to 20% of the adult population of the United States has hypertension. Considered in its etiology are factors such as obesity, smoking, amount of exercise, genetics, kidney disease, and a high intake of salt.[1]

Recent studies indicate that either weight loss or dietary sodium restriction can cause significant reductions in blood pressure in overweight and normal weight hypertensive patients.[2-5] Other measures that should be stressed for the hypertensive patient are increased exercise, decreased cigarette smoking, and education about hypertension and its treatment.[4] Some individuals appear to have an inherited disposition to the development of hypertension. The avoidance of foods high in sodium appears to have a hypertension-reducing effect in these individuals.

Lack of compliance with drug therapy is a major problem in hypertension management.[6] Side effects of drug therapy for hypertension treatment have also been recognized. Treatment of hypertension with weight loss and sodium restriction appears to pose no significant side effects and is likely to enhance a person's overall health and well-being.

Because your practice will include many hypertensive patients, you should be knowledgeable regarding dietary treatment for hypertension and capable of providing counseling to patients which can enhance adherence to a low sodium diet and dietary modifications of potassium if necessary.

Goals

As a result of this unit of study, you should be able to:

1. *Assess the nutritional intake of a hypertensive patient for sodium and potassium;*

2. *Plan an appropriate nutritional program for a hypertensive patient;*

3. *Counsel a hypertensive patient regarding the recommendations for complying with a sodium-restricted diet; and*

4. *Answer questions asked by patients related to the content of sodium and potassium in foods and medications.*

A scenario of a typical hypertensive adult male is included to enhance your ability to evaluate a patient's intake of food, answer questions about nutrition, and advise patients concerning their diets.

Objectives of Dietary Treatment for Hypertensive Patients

The objectives of dietary treatment for the hypertensive patient are as follows and serve as the foundation for planning dietary modification for any hypertensive patient:

- Provide a well-balanced diet that includes sufficient kilocalories, protein, vitamins, and minerals to achieve or maintain good health.
- Achieve or maintain an ideal body weight.
- Provide the correct restriction of sodium with or without accompanying hypertensive drug and diuretic therapy to achieve a decrease in hypertension.
- Prevent and/or treat potassium deficiency in patients receiving potassium-losing diuretics.
- Counsel patients regarding foods to use on low-sodium and/or potassium-replacement diets.
- Attempt a moderate decrease in cholesterol and saturated fats to treat hyperlipidemic conditions when they exist, especially in children or adults under 45 years of age who have a family history of cardiovascular disease.

Patient Scenario

Mr. C. is a 51-year-old businessman who is 6 feet 2 inches in height and weighs 275 pounds. Mr. C. had a severe kidney infection several years ago and comes to you complaining of polyuria, nocturia, and feeling tired a great deal of the time. His blood pressure is 190/110, he has 1+ pedal edema, and his urinalysis indicates a trace to 1+ albuminuria. Other laboratory data are reported to be within normal limits. There is no evidence for urinary tract infection and he takes no medications.

You ask Mr. C. what he had to eat yesterday probing for accurate serving sizes. He responds as follows:

Breakfast: 7:00 a.m. at home

1 c orange juice
2 scrambled eggs
4 sl bacon
3 sl toast with 3 tsp butter and 3 Tbsp jelly
2 c coffee with 3 tsp sugar and 1 oz half and half

Lunch: noon at a fast-food restaurant

¼ lb hamburger
1 lg two-sided bun
Mustard, ketchup, lettuce, tomato slice
1 c French fries
½ c coleslaw
12 oz Coca-Cola

Snack: 3:00 p.m. at the office

½ oz bag salted peanuts

Dinner: 6:00 p.m. at home with wife and teenaged son

6 oz steak, broiled
Large baked potato with 1 Tbsp butter
½ c green peas and mushrooms
2 dinner rolls with 3 tsp butter
⅛ cherry pie with ⅔ c vanilla ice cream
2 c coffee with 3 tsp sugar and 1 oz half and half

Evening: 10:30 p.m.

2 beers (12 oz each)
Potato chips (about 20 chips)

You ask Mr. C. if the food is salted during cooking and if he adds additional salt to his food at the table. He replies, "Yes, the food is salted when prepared, and I have a heavy hand with the salt shaker." As an afterthought he also adds, "It seems like I drink a glass of water every hour or so."

Did Mr. C.'s diet meet the recommendations of The Daily Food Guide which for the adult are as follows (see copy of the Guide in Appendix A at the end of this module)?

- *Milk Group* — Two 8-ounce servings daily
- *Meat Group* — Two 2-ounce servings daily
- *Fruit Group* — Two ½-cup servings daily with one serving a citrus fruit
- *Vegetable Group* — Two ½-cup servings daily with a deep green or yellow-orange vegetable every other day
- *Bread Group* — Four 1-slice or ½-cup servings daily

NO!! Mr. C.'s diet is adequate in only three of the four groups. He did *not* meet the milk group recommendation.

Table 11-1 shows the amount of kilocalories, protein, sodium, and potassium that Mr. C. ate yesterday. He tells you that yesterday's intake is typical of the other days of the week including Saturday and Sunday. Check each of the figures in each column of Table 11-1. You may be surprised at some of the high values, especially for sodium. Look particularly at the eggs, bacon, bread, butter, French fries, potato chips, and table salt.

Evaluation of Mr. C.'s diet indicates an intake of approximately 4,750 kilocalories. How many kilocalories should Mr. C. consume daily based on his ideal body weight? If you said approximately 3,000 kilocalories, you are correct! Read on to learn how to determine this kilocalorie level.

Mr. C.'s ideal body weight at 6 feet 2 inches in height is 190 pounds. To calculate ideal body weight for a man, the following suggestions are helpful:

Table 11-1 Caloric, Protein, Sodium, and Potassium Content of Mr. C.'s Typical Diet

Food	Amount	Kilocalories	Protein (gm)	Sodium (mg)	Potassium (mEq)
Orange juice	1 c	96	0	6	13
Eggs, scrambled	2	224	15	334	4
Bacon, crisp	4 sl	192	5	304	2
Bread	3 sl	192	6	351	3
Butter	3 Tbsp	300	0	414	0
Jelly	3 Tbsp	168	0	0	1
Coffee	4 c	0	0	0	0
Sugar	2 Tbsp	96	0	0	0
Half and half	4 Tbsp	80	2	28	2
Hamburger	4 oz cooked	336	33	275	9
French fries	1 c	456	7	380	33
Soft drink	12 oz	140	0	4	0
Coleslaw	1/2 c	57	1	161	3
Hamburger bun	2 sides	178	5	304	1
Peanuts	1/2 oz	83	4	60	2
Cherry pie	1/8 sl	211	2	167	2
Steak, rib	6 oz cooked	750	34	414	9
Baked potato	1 lg	138	4	6	20
Peas & Mushrooms	1/2 c	55	4	328	3
Dinner roll	2	240	6	200	2
Beer	24 oz	342	4	25	5
Ice cream	2/3 c	189	4	140	2
Potato chips	20 chips	228	2	500	12
Estimated salt used in cooking and at the table	1 Tbsp	0	0	6,000	0
TOTALS	--	4,750	138	10,401	128

1. Use the rule of thumb:
   106 pounds for the first 5 feet *plus* 6 pounds for each additional inch over 5 feet; for Mr. C. this would be 106 + (6 × 14) = 190 pounds.

2. Use the Fogarty chart (Table 11–6 in Appendix B at the end of this module) to determine Mr. C.'s desirable body weight as 156 to 194 pounds.

Next, calculate the kilocalorie needs for Mr. C. This can also be done by two ways:

1. Use the patient's ideal body weight (190 pounds) and multiply by 15 kilocalories per pound to maintain weight. Answer = 2,850 kilocalories.

2. Use the nomogram in Appendix C and plot Mr. C.'s current weight, height, age, sex, and activity level (estimated to be 40% greater than basal energy requirement). Answer = 3,100 kilocalories.

Because Mr. C. is 80 to 100 pounds overweight and it is desirable for him to lose weight, how many kilocalories for a weight-reduction diet would you recommend he consume daily? Again, two ways to determine the kilocalorie level for weight reduction would be appropriate:

1. Multiply 10 kilocalories per pound of ideal body weight for weight loss. This equals about 1,900 kilocalories for Mr. C. (10 kilocalories × 190 pounds).

2. Mr. C.'s basal energy requirement is approximately 2,200 kilocalories (determined from the nomogram). With moderate activity his kilocalorie daily expenditure equals approximately 3,100 kilocalories. A weight-reduction diet of 1,000 kilocalories per day less than expended should result in a 2-pound weight loss per week. (Approximately 3,500 kilocalories equal 1 pound of adipose tissue.) Therefore, approximately a 2,100 kilocalorie diet would be physiologically appropriate for Mr. C.; he should expect a weight loss of approximately 2 pounds per week. It is important to ask Mr. C. how he feels about this kilocalorie level for weight reduction and his expected cooperation at home.

Explain to Mr. C. that a loss of weight will lower his blood pressure and that he will feel better when he has lost weight. (You may refer to Module 9 on dietary management in obesity for counseling suggestions for weight loss, including behavior modification.)

Let us now consider the sodium content of Mr. C.'s diet and how you can estimate the sodium content of his and other patients' diets.

Mr. C.'s diet contains approximately 452 milliequivalents of sodium, which is equal to 10,400 milligrams or 10.4 grams of sodium (452 mEq × 23 mg/mEq = 10,400 mg). Because sodium chloride contains 40% sodium (gram atomic weight of 23) and 60% chloride (gram atomic weight of 35.5), the amount of sodium chloride in Mr. C.'s diet is 26 grams.

Keep Table 11–2 handy to assist you in sodium conversions.

See Appendix D for conversion factors which you may wish to place in your "fingertip" library.

It should be noted that the daily requirement for dietary sodium is approximately 250 to 500 milligrams. Our kidneys are scrupulous in reabsorbing sodium! The average intake of sodium in the United States is 4 to 10 grams daily. In countries such as Italy, Greece, and the Orient, intake of sodium may be considerably higher due to the use of sodium in cooking and food preservation.

The sodium content of food depends upon whether the food is from an animal or a plant source. Generally speaking, milk and milk products, eggs, meat, fish, and poultry contain significant amounts of sodium, whereas animal fats and seed oils contain insignificant amounts of sodium. Cereal grains, fruits, and vegetables also contain insignificant amounts of sodium if they are processed and prepared without the addition of salt or sodium-containing compounds.

The sodium composition of groups of foods in addition to the protein, carbohydrate, fat, and kilocalorie content of the foods is given in Appendix E, Table 11–7, at the end of this module. The table is designed to be used as part of a "fingertip" library that can be used in patient instruction.

All foods contain some sodium, but the major source is salt that is added in food preparation, processing, salting food at the table, and hidden sources in water, over-the-counter medications, and food additives. Be sure to ask your patients

Table 11–2 Sodium Chloride Conversion Factors

Sodium mg	Sodium mEq	Sodium Chloride gm
250	11	0.6
500	22	1.3
1000	44	2.5
1500	65	3.8
2000	87	5.0
3000	130	7.5
4000	174	10.0

Table 11–3 Food Products and Their Sodium-Containing Additives

Food Product	Additive
Bouillon (1,000 milligrams sodium/ cube)	Bouillon (there is a low sodium bouillon cube)
Baking powder, baking soda	Sodium bicarbonate (leavening agent)
Processed cereals, cheese	Disodium phosphate (preservative)
Soups, meat, vegetables	Monosodium glutamate (flavor enhancer)
Chocolate milk, ice cream	Sodium alginate, caseinate, pectinate (texturizer, stabilizer, thickener)
Relishes, sauces, salad dressing	Sodium benzoate (preservative)
Hominy, olives, processed fruits and vegetables	Sodium hydroxide (glazing agent, peeling agent, neutralizer)
Pasteurized cheese, bread, cakes	Sodium propionate (mold inhibitor)
Some dried fruits, glazed fruits, maraschino cherries	Sodium sulfate (bleach and preservative)
Some beverages	Sodium citrate (flavor enhancer)

whether they are using any of the food products listed in Table 11–7. Sodium as a component of additives is found in various foods as shown in Table 11–3.

Because many medications contain sodium, be sure to ask patients about the medications they take. Table 11–8 in Appendix F contains a list of the sodium contents of selected antacids and other medications which are high in sodium.

The amount of sodium in water varies according to its source and the geographic area. The content of sodium in water reflects the sodium content in soil from which the water is drawn. Check with the local health department for the sodium content in the local water supply(ies). A water softener adds additional sodium to water. If your patient uses a water softener, check with the manufacturer for the amount of sodium that would be added.

Because soft drinks may be produced in sections of the United States where water in high in sodium, their content of sodium may also be high. In addition, low-kilocalorie soft drinks may contain sodium-saccharin in place of sugar and thus may need to be limited or omitted on a sodium-restricted diet. Usually up to 2 low-kilocalorie carbonated beverages consumed daily are acceptable on low-sodium diets, except when fewer than 1,000 milligrams of dietary sodium is necessary.

The first step in planning any sodium-restricted diet is to estimate the sodium content of the patient's usual food choices *and* the amount of salt the patient usually adds to foods during preparation and at the table. Use of Table 11–7 in Appendix E will be of help in determining the patient's typical sodium intake. Note that 1 teaspoon of table salt equals 2,000 milligrams, or 87 mEq of sodium. One packet of salt contains approximately ¼ teaspoon salt, which is equivalent to 500 milligrams of sodium.

It is essential to identify the kinds and amounts of processed and convenience foods eaten at home and the frequency with which the patient eats in restaurants and other places away from the home. In order to help patients understand sodium-restricted diets, the diet counselor must help them identify all sources of dietary sodium. People who frequently eat in restaurants will need help on selection of menus. They must be taught to order plain broiled meats, baked potatoes, green salads with oil and vinegar dressings, and fruits for dessert — all prepared without added salt and with no salt added by the patient at the table.

Patients from certain ethnic groups frequently have difficulty adhering to a low-sodium diet. Because Southern people and blacks who eat soul food frequently cook with salt pork, fatback, cured ham, and bacon and frequently fry foods in bacon grease, they must be told to decrease these foods on their low sodium diet. The Jewish patients who follow their dietary laws of heavily salting (koshering) meats before cooking need help in adjusting their dietary habits in relation to their religious beliefs. Rinsing kosher-prepared meats 2 to 3 times before preparation will decrease the content of sodium greatly. Italian patients probably need to decrease their use of canned tomato paste, olives, cheese, and Italian bread. Low-sodium tomato paste can be made at home, and frequently low-sodium Italian bread can be purchased in Italian bakeries. Oriental patients use large amounts of sodium glutamate and soy sauce which are high in sodium, and they must be instructed to decrease use of these flavor enhancers and seasonings. The Greek patient who frequently uses salted olives will also need instruction on decreased use of this accompaniment to meals.

The level of sodium restriction for a hypertensive patient should reflect the patient's medical condition. A severe restriction of dietary sodium is considered to be 1,000 milligrams or less per day, a moderate restriction of dietary sodium is 1,000 or 2,000 milligrams per day, and a mild restriction of sodium is 2,000 to 4,000 milligrams per day. With the effectiveness of current diuretic and antihypertensive therapy, the most common prescriptions vary between 1,000 and 4,000 milligrams of sodium.

What level of sodium intake should you prescribe for hypertensive patients? The following guidelines may be of help to you in this decision:

- If the patient has *pulmonary congestion, congestive heart failure and/or ascites* which persists despite medications, a 250 to 500 milligram sodium diet may be necessary.
- If the hypertensive patient has *3+ to 4+ edema*, but not pulmonary or congestive heart failure, prescribe a 1,000 to 2,000 milligram sodium diet.
- If the hypertensive patient has *1+ to 2+ edema*, prescribe a 2,000 to 3,000 milligram sodium diet.

- If the patient has *moderate heart damage* but no edema, a sodium restriction of 3,000 to 4,000 milligrams daily should be appropriate. This level should also keep patients with congestive heart failure from developing recurrent congestion.
- If the hypertensive patient can be controlled by restriction of dietary sodium alone without diuretics, the diet should contain about 2,500 milligrams daily.

Note that adherence to sodium-restricted diets of 2,000 milligrams or less is very difficult to achieve at home. It is best to refer the patient to a clinical dietitian for in-depth counseling if sodium should be restricted below 4,000 milligrams daily.

Also note that it is not possible to achieve a 1,000 milligram sodium intake or less on a high-protein diet of 2 to 3 grams per kilogram body weight per day.

Are you ready to make a decision concerning the appropriate level of sodium intake for Mr. C.? With a blood pressure of 190/110 and 1 + edema, it would be wise to start with a 2,000 milligram sodium diet and give Mr. C. a diuretic. When his blood pressure has decreased to a satisfactory level, a 4,000 milligram sodium diet would be appropriate as a maintenance diet.

Planning a Low-Sodium Diet

The plan for a sodium-restricted diet is based on the use of foods prepared without salt and foods with a natural low-sodium content. The daily basic plans for different levels of sodium intake are described in Table 11–4 and provide a basis from which you can begin developing an acceptable menu plan for your patient.

As you can see, on the 2,000 milligram sodium diet, Mr. C. can consume 2 cups regular milk per day, fruit as desired, 2 to 4 servings of low-sodium vegetables (vegetables either fresh, canned without salt, or frozen, except frozen peas or Lima beans), 5 slices of regular bread, low-sodium bread as desired, 8 ounces of unsalted meat, 1 egg, 6 teaspoons of butter or regular margarine, low-sodium margarine as desired, 2 to 3 servings of low-sodium desserts, and low-sodium gravies as desired. This will slightly restrict Mr. C. in his typical meat intake; he can use no salt in preparing foods, nor can he use regular salt at the table. He must give up the highly salted foods he likes so much — bacon, pie, ice cream, beer, peanuts, and potato chips — unless he can purchase or prepare these foods without salt being added.

When Mr. C.'s diet is liberalized to 4,000 milligrams, it will be much more palatable than the 2,000 milligram restriction. His cooperation can be expected to improve. On the 4,000 milligram sodium diet, use of regular (not low-sodium) foods is allowed. Foods excessively high in sodium such as those listed in Appendix G (Table 11–10) should be avoided.

Up to 1 teaspoon of regular table salt can be used daily in food preparation or at the table on a diet of 4,000 milligrams of sodium. One serving of a high sodium-containing food can be planned into a 4,000 milligram sodium-restricted diet if a clinical dietitian is consulted and the use of salt in food preparation and at the table is decreased or omitted. On a 4,000 milligram sodium diet, salt used in food preparation and at the table should be measured.

If you have placed Mr. C. on a thiazide, furosemide, or ethacrynic acid diuretic, hypokalemia may occur. In addition to oral intake of potassium chloride, foods with significant quantities of potassium should also be consumed to prevent hypokalemia. Like sodium, potassium is present in all foods, especially in fruits, vegetables, and meats. Increasing the intake of potassium through fruits and vegetables will not raise sodium intake because fruits and most raw or frozen vegetables are low in sodium. Encourage Mr. C. to continue his intake of fruit juice at breakfast.

Mr. C. asks, "Doctor, I just cannot eat food unless it is salted — it tastes too bland. Is there any salt substitute I could use?" An appropriate response would be, "Yes, there are substitutes, but you might also try herbs and spices such as cinnamon, nutmeg, and thyme as seasonings." Seasonings, extracts, herbs, and spices allowed and not allowed on low-sodium diets are found in Tables 11–11 and 11–12 in Appendices H and I. Suggestions for food items for which these spices are best used are also given in Appendix I. Suggest to the patient that these spices might be used in the preparation of food. If this is not satisfactory, then encourage the use of a salt substitute. Salt substitutes are available in drugstores and in most large supermarkets. Indicate that the patient should use

a very small amount of the salt substitute as too much can produce a bitter or metallic taste and ruin the taste of the food. Use of the salt substitute may be more acceptable when added to the food at the table rather than during cooking.

Most salt substitutes contain potassium chloride in place of sodium chloride. Some salt substitutes, however, contain some sodium and should not be used by patients on sodium-restricted diets unless sodium intake can be liberalized to 4,000 milligrams or greater.

Table 11–4 Daily Meal Plan for Sodium-Restricted Diets

Food Groups	Quantities Appropriate for a Daily Sodium Intake of:			
	250 milligrams	500 milligrams	1,000 milligrams	2,000 milligrams
Milk				
Regular	None	1½ cups	2 cups	2 cups
Low sodium	2 cups			
Fruit	5 servings	5 servings	As desired	As desired
Vegetable				
Salt not added	2 servings	2 servings	2–4 servings	2–4 servings
Bread				
Regular	None	None	3 slices	5 slices
Low sodium	3 slices	3 slices	As desired	As desired
Meat				
Salt not added	4 ounces	5 ounces	6 ounces	8 ounces
Egg	1	1	1	1
Butter				
Regular	None	None	None	6 teaspoons
Low sodium	As desired	As desired	As desired	As desired
Low sodium desserts	None	None	1 serving daily	2–3 servings daily
Gravies and broths prepared with low sodium ingredients	None	1 serving	2 servings	As desired

Note: A 4,000 milligram sodium (no added salt) diet can be achieved by:
- Use of regular diet with food prepared with a small amount of salt (1 teaspoon maximum).
- No salt added to the food at the table.
- Foods excessively high in sodium such as ham, bacon, pickles, pretzels, potato chips, and salted crackers should not be eaten (see Table 11–10 in Appendix G) for those foods which should be omitted on all sodium-restricted diets).

Adapted from *Handbook of Clinical Dietetics*, Mid-Ohio Health Planning Federation, Columbus, Ohio, 1975.

Salt substitutes, in addition to potassium chloride, may contain calcium chloride or ammonium chloride, which could be harmful to patients with liver disease and/or renal disease. For patients with severe renal disease, use of all salt substitutes should be discouraged.

Listed in Table 11–5 are some common salt substitutes and their sodium and potassium contents compared to regular table salt when one gram of each product is used. One teaspoon of salt equals 5 grams. Only the first 4 of the salt substitutes in Table 11–5 are acceptable on low-sodium diets.

Regular baking powder and baking soda are high in sodium content. Low-sodium baking powder and soda can be purchased from large grocery stores or pharmacies. See Appendix J for sources, composition, and other information on low-sodium baking powder and soda.

Dietary Considerations in Renal Deteriorating Patients

Thus far we have concentrated on the kilocalorie and sodium content of Mr. C.'s diet. Since he is beginning to show bothersome symptoms (polyuria and nocturia), you decide to check his two-hour post-prandial glucose and find this to be within normal limits. You have, however, noticed a mildly increased blood urea nitrogen and creatinine levels and 2 + proteinuria. Mr. C.'s serum potassium is normal. Should you be concerned about the protein and potassium contents in Mr. C.'s diet?

Protein

Let us discuss the protein level first. Mr. C.'s daily intake of protein is approximately 140 grams. When placed on a 2,000 kilocalorie reduction diet, he will reduce his intake of protein to about 80 to 90 grams.

Would you suggest Mr. C. limit his protein intake at this time? What level of protein would you suggest for Mr. C.? If you said 40 grams of protein, that is much too low for Mr. C. at this point in time! A more appropriate level would be 70 to 80 grams daily. There is no need to restrict dietary protein unless there is evidence of strongly decreased renal function and the creatinine clearance has decreased to 15 to 20 milliliters per minute. According to Anderson,[7] appropriate protein intake is related to the ability of the kidney to clear nitrogenous wastes from the blood. Use Table 11–6 to determine the appropriate protein intake based on renal function.

Table 11–5 Salt Substitutes

Product	Potassium		Sodium	
	mg	mEq	mg	mEq
Morton's Salt Substitute	493	12.6	1	0.06
Co-Salt	476	12.2	1	0.06
Neocurtasal	472	12.1	1	0.06
Adolph's Salt Substitute	333	8.5	2	0.09
Morton's Lite Salt	258	6.6	205	8.90
NaCl (table salt)	0	0.0	393	17.00

Oexmann, M.J.: "Salt Substitutes." *American Journal of Clinical Nutrition*, 29:599, 1976. Used with permission of the American Society for Clinical Nutrition, © 1976, Bethesda, MD.

Protein requirements for adults vary from 0.5 to 0.8 gram per kilogram body weight per day. Eggs, milk, beef, and other complete protein foods with high biological value provide the essential amino acids necessary to meet individual needs. If a 40 gram protein diet restriction is appropriate secondary to diminished renal function, refer the patient to a registered clinical dietitian for counseling. If Mr. C.'s kidney function deteriorates, then you must consider his potassium, sodium, and fluid needs in addition to protein needs.

Potassium

The average intake of potassium for the adult is 2 to 6 grams or 50 to 150 mEq daily. When the kidney has difficulty in filtering the potassium as evidenced by increased serum potassium, a 40 mEq dietary restriction per day is recommended.

It is essential to monitor serum potassium levels frequently as increased intake of potassium in the presence of decreased renal function may cause hyperkalemia. Mr. C.'s daily dietary intake of potassium is approximately 128 mEq, or 5,000 milligrams. There is no need to decrease Mr. C.'s dietary intake of potassium at this time because he has a good urine output and his serum potassium is normal.

Table 11–13 in Appendix K contains a list of the potassium content of selected foods according to food groups. Use this table to evaluate a patient's potassium intake. It will also be of use in instructing patients on a potassium-, protein-, and sodium-restricted diet. It should be included in your "fingertip" library. Appendix J includes addresses of companies supplying low-sodium, low-potassium, and low-protein products which may be required for patients who are on severely restricted sodium, potassium, and protein diets.

Sodium

A mild sodium restriction is generally best advised for the hypertensive patient with some renal failure; a 2 to 4 gram sodium diet is appropriate. This reduction will somewhat decrease the workload of the kidneys. Check urine output for sodium using a 24-hour collection. Dietary sodium intake should usually match urinary sodium losses unless the patient is highly sodium-overloaded.

Fluid Intake

Most patients who receive a diuretic and are on a restricted intake of sodium do not require a decreased fluid intake. If a fluid restriction is considered necessary, use the following guideline:

- *Daily fluid intake (cc)* =
  urine output from previous day (cc) plus insensible loss (600 cc for adults, 400 cc for children).

If you feel that renal dialysis is needed for a patient, hospitalization is necessary and the services of a registered clinical dietitian will also be required. The renal dialysis diet should be high in protein (at least 1 gram protein per kilogram body weight), and moderate in sodium, potassium, and fluid to maintain blood levels within constraints of the ability of the hemodialysis machine and kidneys to normalize blood concentrations.

Now that you have finished talking with Mr. C. regarding his diet, what would you write in his chart concerning his appropriate dietary intervention? Use the SOAP method. (The answers appear at the end of this module.)

Table 11–6 Suggested Protein Intake Based on Creatinine Clearance

Creatinine Clearance ($ml/min/1.73\ m^2$)	Protein Intake* (gm/kg body weight)
30–20	0.7–0.5
19–5	0.4
5	0.3

*To this intake add the amount of protein equal to the 24-hour urinary protein loss. Adapted from Anderson, C.F., Nelson, R.A., Margie, J.D., et al., "Nutritional Therapy for Adults with Renal Failure," *Journal of the American Medical Association*, 223(1): 68–72, 1973.

Summary

This module has emphasized how to restrict the sodium intake in your hypertensive patients. The best rule-of-thumb for uncomplicated hypertension is a diet with no added salt. This restriction increases with the severity of other problems. A good way to supplement potassium in patients taking thiazide diuretics is the proper salt substitute, in small amounts, in addition to fruits and vegetables. A diuretic is not a license to use salt; salt negates the usefulness of a diuretic. Don't forget that weight loss by the proper dietary and exercise approach can lower the blood pressure of overweight patients.

Answers

S: "I have a heavy hand with the salt shaker. It seems like I drink a glass of water every hour or so." Some polyuria and nocturia.

O: Current weight of 275 pounds, ideal weight of 190 pounds (height is 6 feet 2 inches). Normal blood glucose and potassium with slight increase in blood urea nitrogen and creatinine, 1+ albuminuria, blood pressure of 190/110, and 1+ edema.

A: Typical dietary intake assessment: 4,750 kilocalories, 140 grams protein, 10 grams sodium. Needs to increase consumption of milk or milk products. Patient asked many questions regarding dietary instruction. He will have difficulty adhering to the 4 gram sodium portion of this diet, yet compliance is expected in this motivated patient who has the support of his family. Will use spices and salt substitute to aid in decreasing sodium intake. The salt substitute will increase the patient's potassium intake which is needed since a thiazide diuretic will be started today in view of the degree of hypertension.

P: Diet prescription: 2,000 kilocalorie, 80 grams protein, 4,000 milligrams sodium. Follow-up in two weeks on diet instruction, edema, blood pressure, and weight. Call nurse in one week to report changes in weight, edema, and urination.

References and Bibliography

1. Dahl, L.K.: "Salt and Hypertension." *American Journal of Clinical Nutrition*, 25:231-244, 1972.

2. Reisin, E.: "Effect of Weight Loss Without Salt Restriction on the Reduction of Blood Pressure in Overweight Hypertensive Patients." *New England Journal of Medicine*, 298:1-6, 1978.

3. Stamber, R.: "Weight and Blood Pressure: Findings in Hypertension Screening of 1 Million Americans." *Journal of the American Medical Association*, 240: 1607-1610, 1978.

4. Agaard, G.N.: "The Management of Hypertension." *Journal of the American Medical Association*, 244:329-332, 1973.

5. Morgan, T., et al.: "Hypertension Treated by Salt Restriction." *Lancet*, 1:227-230, February, 1978.

6. McKenney, J.M., Slining, J.M., Henderson, H.R., et al.: "The Effect of Clinical Pharmacy Services on Patients with Essential Hypertension." *Circulation*, 48:1104-1111, 1973.

7. Anderson, C.F., Nelson, R.A., Margie, J.D., et al.: "Nutritional Therapy for Adults with Renal Disease." *Journal of the American Medical Association*, 223(1):68-72, 1973.

Resources for the Physician

Current Issues in the Management of Hypertension: New Trends in Dietary Management. Rochester, NY, Pennwalt Prescription Products, 1978 (14623).
A free 20-page publication of the highlights of a recent conference. Monograph includes views of many experts on the dietary aspects of antihypertensive therapy, the hypertensive diet, the role of salt restriction, and potassium-loss problems.

Resources for the Patient

Recipes and Meal Planning for Sodium Restricted Diets for Patients

American Heart Association, local office or 44 East 23rd St., New York, NY 10010. Booklets on various levels of sodium restricted diets available.

Field, F.: *Gourmet Cooking for Cardiac Diets*. New York, Collier Books, 1962.

Planning Low Sodium Meals. New York, The Nutrition Foundation, Inc. (99 Park Ave. 10016).

Low Sodium Diets Can Be Delicious. New York, Standard Brands, Inc. (625 Madison Ave. 10022).

Halt! No Salt. Bellevue, WI, Dietary Research (16035 N.E. Second St. 98008).

Jones, J.: *Secrets of Salt-Free Cooking*. New York, Scribner's (575 Fifth Ave. 10017). 192 pp. ($9.95 cloth, $5.95 paperback).
Contains a variety of low-sodium recipes and menus which are also low in sugar, cholesterol, and animal fat. Calorie counts, diabetic exchanges, and milligrams sodium per serving size are also given. The author provides a comprehensive guide to sodium values for common (and some unusual) foods and alcoholic beverages. Suggestions are made for following a low-sodium diet while entertaining at home or dining with friends, eating in restaurants, and while traveling by plane.

Appendix A

Figure 11–1 The Daily Food Guide

Figure 11–1 Daily Food Guide (continued)

Guide to Good Eating...

A Recommended Daily Pattern

The recommended daily pattern provides the foundation for a nutritious, healthful diet.

The recommended servings from the Four Food Groups for adults supply about 1200 Calories. The chart below gives recommendations for the number and size of servings for several categories of people.

Food Group	Recommended Number of Servings				
	Child	Teenager	Adult	Pregnant Woman	Lactating Woman
Milk 1 cup milk, yogurt, OR **Calcium Equivalent** 1½ slices (1½ oz) cheddar cheese* 1 cup pudding 1¼ cups ice cream 2 cups cottage cheese*	3	4	2	4	4
Meat 2 ounces cooked, lean meat, fish, poultry, OR **Protein Equivalent** 2 eggs 2 slices (2 oz) cheddar cheese* ½ cup cottage cheese* 1 cup dried beans, peas 4 tbsp peanut butter	2	2	2	3	2
Fruit-Vegetable ½ cup cooked or juice 1 cup raw Portion commonly served such as a medium-size apple or banana	4	4	4	4	4
Grain, whole grain, fortified, enriched 1 slice bread 1 cup ready-to-eat cereal ½ cup cooked cereal: pasta, grits	4	4	4	4	4

*Count cheese as serving of milk OR meat, not both simultaneously.

Others: complement but do not replace foods from the Four Fifted Groups. Amounts should be determined by individual dietary needs.

Nutrients for Health

Nutrients are chemical substances obtained from foods during digestion. They are needed to build and maintain body cells, regulate body processes, and supply energy.

About 50 nutrients, including water, are needed daily for optimum health. If one obtains the proper amount of the 10 "daily" nutrients in the daily diet, the other 40 or so nutrients will likely be consumed in amounts sufficient to meet body needs.

One's diet should include a variety of foods because no single food supplies all the 50 nutrients, and because many nutrients work together.

When a nutrient is added or a nutritional claim is made, nutrition labeling regulations require listing the 10 "daily" nutrients on food packages. These nutrients appear in the chart below with food sources and some major physiological functions.

Nutrient	Important Sources of Nutrient	Some major physiological functions		
		Provide energy.	Build and maintain body cells.	Regulate body processes.
Protein	Meat, Poultry, Fish Dried Beans and Peas Egg Cheese Milk	Supplies 4 Calories per gram.	Constitutes part of the structure of every cell, such as muscle, blood, and bone; supports growth and maintains healthy body cells.	Constitutes part of enzymes, some hormones and body fluids, and antibodies that increase resistance to infection.
Carbohydrate	Cereal Potatoes Dried Beans Corn Bread Sugar	Supplies 4 Calories per gram. Major source of energy for central nervous system.	Supplies energy so protein can be used for growth and maintenance of body cells.	Unrefined products supply fiber – complex carbohydrates in fruits, vegetables, and whole grains – for regular elimination. Assists in fat utilization.
Fat	Shortening, Oil Butter, Margarine Salad Dressing Sausages	Supplies 9 Calories per gram.	Constitutes part of the structure of every cell. Supplies essential fatty acids.	Provides and carries fat-soluble vitamins (A, D, E, and K).
Vitamin A (Retinol)	Liver Carrots Sweet Potatoes Greens Butter, Margarine		Assists formation and maintenance of skin and mucous membranes that line body cavities and tracts, such as nasal passages and intestinal tract, thus increasing resistance to infection.	Functions in visual processes and forms visual purple, thus promoting healthy eye tissues and eye adaptation in dim light.
Vitamin C (Ascorbic Acid)	Broccoli Orange Grapefruit Papaya Mango Strawberries		Forms cementing substances, such as collagen, that hold body cells together, thus strengthening blood vessels, hastening healing of wounds and bones, and increasing resistance to infection.	Aids utilization of iron.
Thiamin (B_1)	Lean Pork Nuts Fortified Cereal Products	Aids in utilization of energy.		Functions as part of a coenzyme to promote the utilization of carbohydrate. Promotes normal appetite. Contributes to normal functioning of nervous system.
Riboflavin (B_2)	Liver Milk Yogurt Cottage Cheese	Aids in utilization of energy.		Functions as part of a coenzyme in the production of energy within body cells. Promotes healthy skin, eyes, and clear vision.
Niacin	Liver Meat, Poultry, Fish Peanuts Fortified Cereal Products	Aids in utilization of energy.		Functions as part of a coenzyme in fat synthesis, tissue respiration, and utilization of carbohydrate. Promotes healthy skin, nerves, and digestive tract. Aids digestion and fosters normal appetite.
Calcium	Milk, Yogurt Cheese Sardines and Salmon with Bones Collard, Kale, Mustard, and Turnip Greens		Combines with other minerals within a protein framework to give structure and strength to bones and teeth.	Assists in blood clotting. Functions in normal muscle contraction and relaxation, and normal nerve transmission.
Iron	Enriched Farina Prune Juice Liver Dried Beans and Peas Red Meat	Aids in utilization of energy.	Combines with protein to form hemoglobin, the red substance in blood that carries oxygen to and carbon dioxide from the cells. Prevents nutritional anemia and its accompanying fatigue. Increases resistance to infection.	Functions as part of enzymes involved in tissue respiration.

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Appendix B

Table 11–7 Guidelines for Body Weight

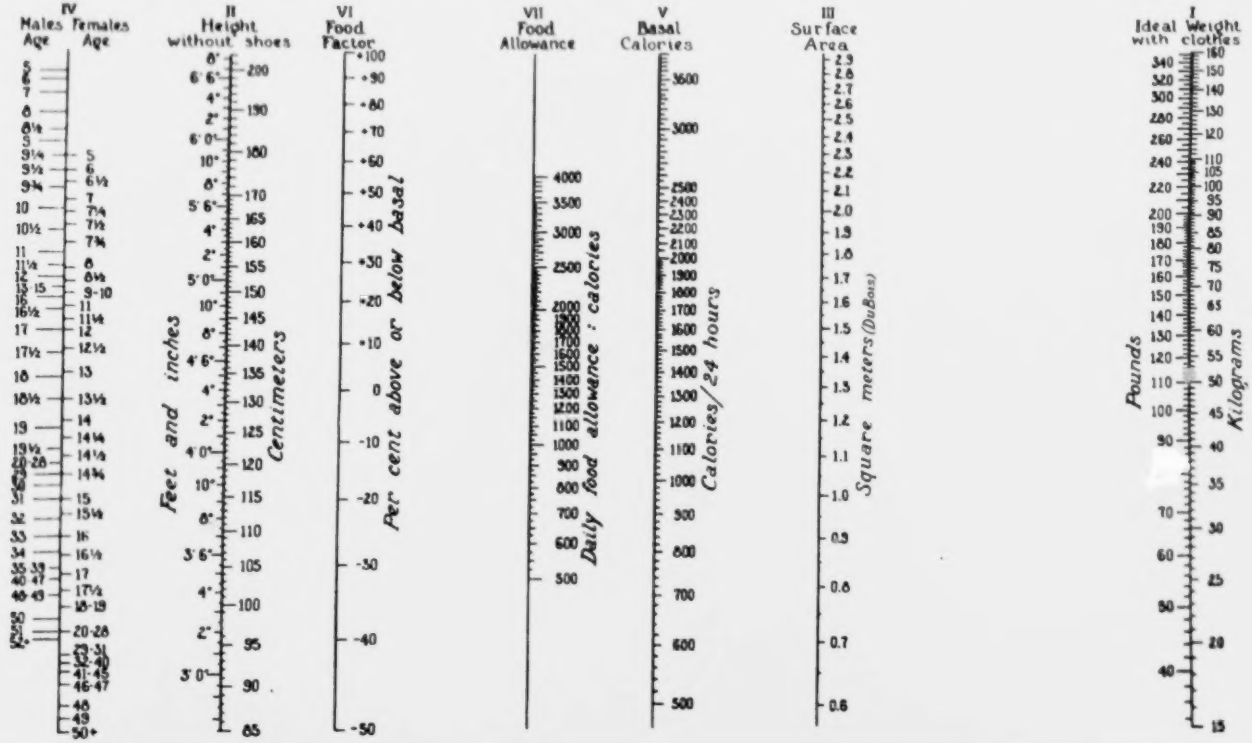
Height*		MEN Weight (lb)*			WOMEN Weight (lb)*		
Ft	in	Average	Acceptable weight		Average	Acceptable weight	
4	10				102	92	119
4	11				104	94	122
5	0				107	96	125
5	1				110	99	128
5	2	123	112	141	113	102	131
5	3	127	115	144	116	105	134
5	4	130	118	148	120	108	138
5	5	133	121	152	123	111	142
5	6	136	124	156	128	114	146
5	7	140	128	161	132	118	150
5	8	145	132	166	136	122	154
5	9	149	136	170	140	126	158
5	10	153	140	174	144	130	163
5	11	158	144	179	148	134	168
6	0	162	148	184	152	138	173
6	1	166	152	189			
6	2	171	156	194			
6	3	176	160	199			
6	4	181	164	204			

*Height without shoes, weight without clothes.

Reproduced with permission from Bray, G.A.: "Obesity," in Dowling, H.F., et al. (eds.), *Disease-A-Month*, c. 1979, by Year Book Medical Publishers, Inc., Chicago. (Adapted from the recommendations of the Fogarty Center Conference, 1973.)

Appendix C

Figure 11–2 Nomogram for Estimating Caloric Needs



Directions for Estimating Caloric Requirement: To determine the desired allowance of calories, proceed as follows: 1. Locate the ideal weight on Column I by means of a common pin. 2. Bring edge of one end of a 12 or 15-inch ruler against the pin. 3. Swing the other end of the ruler to the patient's height on Column II. 4. Transfer the pin to the point where the ruler crosses Column III. 5. Hold the ruler against the pin in Column III. 6. Swing the left hand end of the ruler to the patient's sex and age (measured from last birthday) given in Column IV (these positions correspond to the Mayo Clinic's metabolism standards for age and sex). 7. Transfer the pin to the point where the ruler crosses Column V. This gives the basal caloric requirement (basal calories) of the patient for 24 hours and represents the calories required by the fasting patient when resting in bed. 8. To provide the extra calories for activity and work, the basal calories are increased by a percentage. To the basal calories for adults add: 50 to 80 per cent for manual laborers, 30 to 40 per cent for light work or 10 to 20 per cent for restricted activity such as resting in a room or in bed. To the basal calories for children add 50 to 100 per cent for children ages 5 to 15 years. This computation may be done by simple arithmetic or by the use of Columns VI and VII. If the latter method is chosen, locate the "per cent above or below basal" desired in Column VI. By means of the ruler connect this point with the pin on Column V. Transfer the pin to the point where the ruler crosses Column VII. This represents the calories estimated to be required by the patient.

Used with permission of the Mayo Clinic, Rochester, MN.

Appendix D

Conversion Factors

1. *To convert milligrams of sodium to milliequivalents of sodium,* divide milligrams by atomic weight of sodium which is 23.

2. To convert amount of sodium to sodium chloride multiply by 2.54. This factors results from dividing the atomic weight of sodium by 100, or 23 ÷ 100 = 2.54.

3. To convert a specific weight of sodium chloride to sodium, multiply by 0.40 because 40 percent of NaCl by weight is sodium.

Appendix E

Table 11–8 Sodium, Carbohydrate, Protein, Fat, and Kilocalorie Content of Foods in Food Groups

Food Group	Household Measure	Wt. grams	Na+ milli-grams	Carbohy-drate grams	Protein grams	Fat grams	Kilo-calories
Milk							
Whole	1 cup	240	120	12	8	10	170
Skim	1 cup	240	120	12	8	0	80
Low sodium milk	1 cup	240	7	12	8	10	170
Buttermilk, salted	1 cup	240	280	12	8	3	110
Meat							
Beef, pork, poultry	1 ounce	30	25	0	7	5	75
Duck, lamb, liver	1 ounce	30	25	0	7	5	75
Fish, fresh	1 ounce	30	25	0	7	3	55
Fish, low sodium canned	1 ounce	30	25	0	7	3	55
Egg	1 medium	50	70	0	7	5	75
Cottage cheese, regular	1/4 cup	55	150	2	8	2	60
Cheese, regular	1 ounce	30	210	1	7	9	120
Cottage cheese, low sodium	1/4 cup	55	25	2	8	2	60
Cheese, low sodium	1 ounce	30	210	1	7	9	115
Ham, cured	1 ounce	30	230	0	7	11	130
Bacon, cooked	1 slice	7	85	0	2	5	55
Chipped or dried beef	1 ounce	30	1,220	2	6	4	70
Luncheon meats	1 ounce	30	650	2	4	8	95
Frankfurters	1	50	550	1	7	10	120
Vegetables							
Raw, cooked, fresh, frozen	1/2 cup	100	9	5	2	0	25
Regular canned	1/2 cup	100	230	5	2	0	25
Dried beans and peas	1/2 cup	100	3	22	8	0	118
Potatoes	1/2 cup	100	3	18	2	0	78
Peas, frozen	2/3 cup	100	115	12	5	0	68
Greens (spinach, chard, kale, mustard, etc.)	1/2 cup	90	45	3	3	0	25
Lima beans, frozen	5/8 cup	100	129	22	7	0	118
Sauerkraut, canned	2/3 cup	100	750	4	1	0	18
Pickles							
sweet	1 large	100	673	18	1	0	76
dill	1 large	100	1,428	2	1	0	11

Table 11-8 (continued)

Food Group	Household Measure	Wt. grams	Na+ milli-grams	Carbohy-drate grams	Protein grams	Fat grams	Kilo-calories
Bread							
Salted yeast bread	1 slice	23	150	15	2	0	70
Low sodium bread, pasta or cereals	1 slice or 1/2 cup	23	5	15	2	0	70
Instant oatmeal, cream of wheat	3/4 cup	27	135	19	5	0	98
Potato chips, 2" diameter	10 chips	20	200	10	1	8	113
Saltine cracker	1 cracker	3	33	3	0	0	14
Fruits, raw, frozen, or canned	1/2 cup	100	2	10	0	0	40
Olives, green, pickled	2 medium	13	312	0	0	2	18
Olives, ripe, salt cured	3 medium	20	658	0	2	7	67
Fat							
Salted butter or margarine	1 teaspoon	5	50	0	0	5	45
Low sodium	1 teaspoon	5	5	0	0	5	45
Table Salt - NaCl	1 teaspoon	5	2,000	0	0	0	0
Canned soups							
Nuts, salted, unblanched	15	15	24	3	3	9	105

Appendix F

Table 11–9 Sodium Content of Selected Antacids

High Sodium Content			Low Sodium Content		
Drug	Sodium mg	Average Dose	Drug	Sodium mg	Average Dose
Bisodol Powders	1,540	1 packet	Gelusil	21	15 milliliters
Sodium Bicarbonate	1,232	1 teaspoon	Mylanta II liquid	20	10 milliliters
Sal Hepatica	1,000	1 teaspoon	Riopan	2	3 tablets
Alka Seltzer (Blue)	1,064	2 tablets			
Bromo Seltzer	717	1.25 grams			
Metamucil Instant Mix	250	1 packet			
Rolaids	100	2 tablets			
Creamalin Tablets	50	2 tablets			
Tums	40	2 tablets			
Phosphaljel Suspension	39	15 milliliters			
Titralac Liquid	38	15 milliliters			
Milk of Magnesia	36	30 milliliters			

Note: Riopan is recommended for patients on sodium restricted diets.

Lipman, A.G.: "Sodium Content of Frequently Used Analgesic and Gastrointestinal Drugs." *Modern Medicine*, 45:59-60, 1977. Used with permission of *Modern Medicine*, © 1977, New York.

Other High Sodium Containing Drugs

Barbiturates
Sulfonamides
Antibiotics
Cough Medicine
Laxatives
Toothpastes, powders, mouthwashes

Appendix G

Table 11–10 High-Sodium Foods to Be Avoided on Low-Sodium Diets

Milk

Buttermilk

Meat

Ham
Bacon
Salt pork
Chipped beef
Corned beef
Smoked tongue
Smoked fish
Luncheon meats
Frankfurters
Sausage
Canned meats
Frozen fish fillets
Shellfish except oysters
Anchovies
Caviar
Meat extracts
Bouillon cubes
Meat sauces
Meat substitutes (soy protein)

Vegetables

Frozen peas and Lima beans
Spinach, chard, collards, dandelion greens, kale, mustard greens, and turnip greens
Celery
Sauerkraut
Watercress
Beets
Carrots
Turnips

Breads and Cereals

Instant oatmeal and Cream of Wheat
Dry cereals
Quick-cooking rice
Instant mashed potatoes
Potato chips, salted
Popcorn, salted
Snack crackers
Salted-top crackers

Convenience Foods

TV dinners
Frozen vegetables in seasoned sauce
Biscuits, muffin, pancake, cake and cookie mixes
Self-rising flours
Seasoned rice
Packaged potato dishes
Hamburger extenders
Seasoned bread stuffings
Canned soups
Salted nuts
Prepared condiments, relishes, Worchestershire sauce, catsup, pickles, mustard, olives
Seasoning salts

Appendix H

Table 11-11 Seasonings, Extracts, Herbs, and Spices

Low in Sodium-Use as desired	Low in Sodium (continued)
Allspice	Pimento peppers
Almond Extract	Poppy seed
Anise seed	Poultry seasoning
Basil	Purslane
Bay leaf	Rosemary
Bouillon cube, low-sodium dietetic if less than 5 milligrams sodium per cube	Saccharin, if calcium-based
Caraway seed	Saffron
Cardamon	Sage
Catsup, low-sodium dietetic	Salt substitutes, except those that contain part sodium
Chili powder	Savory
Chives	Sesame seeds
Cinnamon	Sorrel
Cloves	Sugar
Coconut	Tarragon
Cumin	Thyme
Curry	Turmeric
Dill	Vanilla extract
Fennel	Vinegar
Garlic, garlic juice, garlic powder	Wine if allowed
Ginger	Walnut extract
Horseradish root or horseradish prepared without salt	**High in Sodium-Do not use**
Juniper	Bouillon cubes, regular
Lemon juice or extract	Catsup
Mace	Celery flakes, seed, salt
Maple extract	Chili sauce
Marjoram	Garlic salt
Meat extract, low sodium dietetic	Horseradish prepared with salt
Meat tenderizers, low sodium dietetic	Instant vegetable broth
Mint	Meat extract
Mustard, dry or seed	Meat sauces
Nutmeg	Meat tenderizers
Onion, onion juice or onion powder	Monosodium glutamate
Orange extract	Mustard, prepared
Oregano	Olives
Paprika	Onion salt
Parsley	Parsley flakes
Pepper, fresh green or red	Pickles
Pepper, black, red, or white	Relishes
Peppermint extract	Saccharin, sodium-based
	Salt
	Soy sauce
	Tomato sauce
	Worcestershire sauce

Mitchell, H., Rynbergen, H.J., Anderson, L., and Dibble, M.V. *Nutrition in Health and Disease*, 16th ed., Philadelphia. Used with permission of J.B. Lippincott Co., © 1976, Philadelphia, PA.

Appendix I

Table 11–12 Low-Sodium Seasonings for Added Flavor

Seasonings:	Used With:
Allspice	Ground meats, stew meats, tomatoes
Bay Leaves	Meat, poultry, tomatoes
Caraway Seeds	Meats, salads, cabbage, asparagus, noodles
Chives	Salads, eggs, meat dishes, vegetables
Curry Powder	Meats (especially lamb), chicken, fish tomatoes
Lemon Juice	Meats, fish, poultry, salads, vegetables
Mustard (Dry)	Ground meats, salads
Nutmeg	Fruits, potatoes
Onion or Garlic Cloves	Meats, salads, vegetables
Paprika	Meats, fish, vegetables
Parsley	Meats, fish, salads, vegetables
Rosemary	Chicken, veal, meat loaf, beef, potato, fresh peas, fresh Lima beans
Sage	Meats, tomatoes, green beans
Thyme	Eggs, meats (espeically veal and pork), onions, fresh peas, tomatoes, salads
Vinegar	Salads, vegetables

Adapted from *The Low Sodium Handbook*, 1973 edition. Columbus Dietetic Association, American Heart Association, Central Ohio Heart Chapter, Inc., Franklin County Heart Branch.

Appendix J

Baking Powder

Commercially prepared sodium-free baking powder is sometimes available in the special diabetic sections of grocery stores or at special food stores. It comes in small quantities in tightly sealed containers. If not available in these stores, write the following prescription for sodium-free baking powder to be filled by a pharmacist:

Potassium bicarbonate:	79.5 grams
Cornstarch:	56 grams
Tartaric acid:	15 grams
Potassium bitartrate:	112.25 grams

Mix the powders thoroughly and sift several times before using.

One and one-half teaspoons equals 1 teaspoon of regular baking powder. When using this product, instruct patients to avoid over-beating and bake immediately at preheated correct temperatures.

Baking Soda

Potassium bicarbonate is available at drugstores and is an equal substitute for baking soda.

Companies Supplying Low Sodium and Low Potassium Foods and Low Protein Products

1. Henkel Corporation, Minneapolis, MN 55435.
   Aproten Low Protein Diet Products
   Dietetic Paygel Baking Mix
   Cal-Power — High calorie, low in sodium and potassium and relatively nitrogen free product.
2. Ener-G-Foods, Inc., 1526 Utah South, Seattle, WA, 98134.
   Jolly Ann Baked Low Protein Bread.
3. Cellu-Featherweight Products, Chicago Dietetic Supply, Inc., La Grange, IL 60525.
   Low protein baking mix
   Low sodium and low potassium products
   Unsweetened canned fruits and vegetables
4. Ross Laboratories, Division of Abbott Laboratories, 625 Cleveland Ave., Columbus, OH 43216
   Polycose Powder and Liquid. A high caloric, low sodium and low potassium product, nitrogen free.
5. Doyle Pharmaceutical Co., Division of Delmark Company, 5320 West 23rd St., Minneapolis, MN 55416
   Controlyte — High calorie, low electrolytes, and relatively nitrogen free.

Appendix K

Table 11-13 Potassium, Protein, and Sodium Content of Selected Foods

Food Groups	Household Measure	Grams	Protein (grams)	Sodium (milligrams)	Potassium (milliequivalents)
Milk					
Whole milk, skim milk, ice cream	1/2 cup	120	4	60	4.5
cheese, American, slice	1 ounce	30	7	197	0.5
cottage cheese, cream style	1/2 cup	100	14	229	2.0
Meat					
Raw oysters; lobster or shrimp, canned without salt; tuna canned in water	1 ounce	30	7	60	1.8
Beef, lamb, pork, rabbit, poultry, cod, haddock	1 ounce	30	7	25	3.0
Balogna (1½ slice) frankfurther (1 medium) ham (1 ounce)	Varies	Varies	7	250-500	3.0
Tuna, canned in oil	1/2 cup	90	29	800	7.5
Bacon	1 ounce	30	2.3	71	0.5
Peanut Butter	1 Tablespoon	15	4.0	18	2.5
Egg	1	50	7	70	2.6
Vegetables (cooked, canned, without salt, drained)					
Beans (green or wax), beets, cabbage, corn, cauliflower, eggplant, summer or zucchini squash, lettuce (1/6 head), onions	1/2 cup	100	1	9	3.8
Asparagus, broccoli, Brussel sprouts, carrots, potatoes (½ small baked or ½ cup boiled, or 7 strips French fries), pumpkin, winter squash (1/3 cup), tomatoes low-sodium tomato juice, turnips	1/2 cup	100	2	9	6.2
Peas, frozen, mixed vegetables	2/3 cup	100	5	115	3.5
Lima beans, frozen, mixed vegetables(½c.)	1/2 cup	110	7	130	10.0
Red kidney beans, canned	3/4 cup	150	9	5	13.0
Pickle, 4" dill	1 large	100	1	1428	7.0
Celery	1 large stalk	40	0	50	3.5

(continued on page 28)

Table 11-13 (continued)

Food Group	Household Measure	Grams	Protein (grams)	Sodium (milligrams)	Potassium (milliequivalents)
Fruits					
Apple (small), apple juice, applesauce, blueberries, pear nectar, pear (½ sm), peach nectar, peach (½ sm.), pineapple	1/2 cup	100	1	2	2.6
Fruit cocktail, grape juice, grapefruit, grapefruit juice, pineapple juice, plums, raspberries, strawberries, tangerine, watermelon	1/3-1/2 cup	100	1	2	3.7
Cherries, heavy syrup canned or 20 raw sweet	3/4 cup	100	1	2	6
Orange	1 medium or 1/2 cup	150	2	2	7.5
Banana	1 medium or 1 cup sliced	150	2	2	14.0
Dried apricots, peaches	17 halves	100	5	26	
Bread					
Low-sodium bread (1 slice), unsalted cooked rice or farina or corn grits (3/4 cup), puffed rice or unsalted corn flakes (1 cup), whole wheat bread (1 slice=2 milliequivalents potassium)	Varies	Varies	2	5	0.6
Puffed wheat, unsalted and cooked macaroni or noodles or spaghetti	1/2 cup	100	3	5	1.3
Low protein bread made with Paygel Baking Mix	1 slice	30	0.1	15	0.2
Fat					
Salted butter, margarine, mayonnaise	1 teaspoon	5	0	50	0
Miscellaneous					
Pepsi, Royal Crown Cola, spices and flavorings, sugars and candies	use as desired				

Some Abbrevations Used in the Nutrition in Primary Care Series

ATP	adenosine triphosphate
c	cup
cc	cubic centimeter
CNS	central nervous system
FDA	Food and Drug Administration
gm	gram
IBW	ideal body weight
IU	International Units
kcal	kilocalorie
kg	kilogram
lb	pound
lg	large
MCV	mean corpuscular volume
MDR	minimum daily requirement
med	medium
mEq	milliequivalent
mg	milligram
MJ	megajoule
ml	milliliter
oz	ounce
RDA	Recommended Dietary Allowances
RE	retinol equivalents
sl	slice
sm	small
Tbsp	Tablespoon
TPN	total parenteral nutrition
tsp	teaspoon
USDA	United States Department of Agriculture